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Improving Utilization of F/A-18 Simulator CUBIC Instructors at VFA-106, Naval Air Station Oceana, VA

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EMBA PROJECT REPORT

Improving Utilization of F/A-18 Simulator CUBIC Instructors at VFA-106, Naval Air Station Oceana, VA

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EXECUTIVE SUMMARY

Strike Fighter Squadron ONE ZERO SIX (VFA-106), the only East Coast F/A-18 Fleet Replacement Squadron (FRS), has identified problems in Cubic Instructor (CI) capacity during periods of high demand as a result of combining series of aircraft, C/D and E/F, into larger "Super" classes. Subsequently, the squadron is forced to augment CIs with Instructor Pilots (IPs) or Instructor Weapons System Officers (IWSOs) to increase capacity or forego utilization of some of their 70 simulator hours allotted to them daily. A simulator process improvement study was undertaken to help VFA-106 address these issues, ultimately improving production and time-to-train.

FINDINGS

- The current CI contract is inefficient due to its inflexibility
- Simply increasing CI manning is not a long-term solution
- The current VFA-106 simulator scheduling construct is insufficient and lacks long-term vision

RECOMMENDATIONS

- Draft and utilize a more flexible CI contract
- Institute simulator scheduling process improvements to provide more continuity and a long-term vision

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I. INTRODUCTION AND BACKGROUND

A. INTRODUCTION

The United States Navy's Strike Fighter Squadron ONE ZERO SIX (VFA-106), based at NAS Oceana, Virginia Beach, VA, is the East Coast's Fleet Replacement Squadron (FRS) for training new and refresher F/A-18C/D Hornet and F/A-18E/F Super Hornet aircrew. VFA-106 is experiencing difficulty maximizing its simulator training opportunities during peak forecast demand times with its new "Super" class construct. The squadron has identified inefficiency in CUBIC Instructors' (CI – civilian-contracted simulator instructors) hours that forces the squadron to: 1. Utilize Instructor Pilots (IPs) or Instructor Weapons Systems Officers (IWSOs) to complete the simulator schedule, or 2. Not utilize the 70 hours they are allotted each day to complete their training. This inefficiency slows time-to-train, affecting production and ultimately the command's mission.

B. BACKGROUND

Because the aircraft are so similar, VFA-106 has decided, in an effort to streamline training, to combine classes of six to eight naval aviators and three to four naval flight officers of a particular model aircraft into larger "Super" classes, consisting of both F/A-18C/D and F/A-18E/F aircrew. The benefits of combining the classes are:

- Fewer classes for the squadron to manage
- Training combined in the five major phases of instruction (Transition, Strike, Fighter, Strike Fighter, and Carrier Qualification):
    - Instructors not having to give same lecture twice to two separate classes in a similar phase of instruction (economy of resources)
    - Operation's tracking of class progress is less complex
- Less time required on detachment (from two, two-week detachments to one, three-week detachment)

As described in the Introduction, an unintended consequence of combining the classes is a bottleneck of students in the simulator phase of training during times of peak demand. The high demand usually occurs seven or eight weeks prior to a detachment, at the beginning of each phase, or when a combination of the two align as per the master syllabus flow with multiple classes in different phases of training. The bottleneck occurs not from a lack of simulator device hours allotted to VFA-106, but rather from inefficiency in CI support and scheduling.

C. PROJECT OBJECTIVE

As discussed during the Contracting meeting on 21 July 2010, the objective of this project was to recommend the best Course of Action (COA) for VFA-106 to improve CI utilization.

D. PROJECT SCOPE

This project does not address the validity of the current master syllabus or any simulator requirements for VFA-106. Because the squadron has typically been able to meet the requirements of the master syllabus, BRB Consulting focuses on a recommendation for VFA-106 to improve CI utilization.

Because of VFA-106's detachment-centric structure in all but the Transition and Strike Fighter phases of training, the recommendations set forth in this project are specific to VFA-106. The conclusions and recommendations are not to be used to remedy similar problems seen by the other FRSs.

To avoid any conflict of interest, individual CIs were not consulted, interviewed, or asked to provide data for the purposes of this study. BRB Consulting coordinated all CI data calls through the F/A-18 simulator Contracting Officer Representative (COR), who is a government employee.

The following assumptions were made during the course of the study:

- Average CI Contact time = 2.5 hours per simulator event
- Because a new CI contract is being bid on, for legal reasons cost data was not available; cost did not affect the study, as each COA cost values are similar
- Under the current construct, it is not cost effective for VFA-106 to ever achieve its highest weekly CI demand

E. METHODOLOGY

BRB Consulting used the principles of Lean Six-Sigma (Appendix 5), Theory of Constraints, and quantitative measures to analyze VFA-106's CI utilization. Specifically we accomplished the following:

1. Interviewed Simulator Schedulers, Naval Aviation Production Program (NAPP) Manager, Current Operations Officer, Future Operations Officer, and F/A-18 Simulator Contracting Officer Representative (COR). (Appendix 1)
2. Observed simulator scheduling process. (Appendix 1)
3. Collected and analyzed March – July 2010 CI, VFA-106 Instructor, and device time utilization data. (Appendix 2)
4. Collected and analyzed FY11 – FY14 forecast production requirements. (Appendix 3)
5. Forecasted weekly CI demand requirements for highest demand year, FY-11. (Appendix 4)
6. Developed a recommendation to optimize CI utilization.

II. RESULTS

A. CURRENT CI CONTRACT IS INEFFICIENT DUE TO ITS INFLEXIBILITY

1. In FY11, based on weekly forecast data, VFA-106 CI hours demand exceeds CI hours capacity 48 percent of the time.

Based on FY11 weekly forecast demand data (Appendix 4) and master syllabus CI requirements, VFA-106, due to its new "Super" class construct, will require more CI hours during times of peak demand. Because training is segmented into five phases, each with simulator requirements, simulator demand at VFA-106 ebbs and flows, predictably. Since multiple staggered classes are simultaneously ongoing, sometimes those periods of high demand coincide to create periods of extremely high demand. When CI demand is in excess of CI capacity for five consecutive weeks, a bottleneck of Replacement Aircrew (RAC) is created. These extremely high demand periods greatly exceed CI availability, which slows training and production. Historically, VFA-106 has utilized active duty IPs and IWSOs to increase capacity to meet RAC needs during these times.

2. The current CI contract does not allow an ability to surge to meet peak demand.

The current CI contract limits all CIs, full and part-time, to 68 hours of contact time with VFA-106 aircrew, using a maximum of ten CIs at any given time. Contact times include academic (lecture) time, brief and debrief time (typically scheduled at 0.5 hours each), and simulator instruction time (time "in box"). VFA-106 can neither schedule greater than 68 total CI hours nor can they use the CIs during premium time, defined as time outside of the normal simulator operating hours. At full capacity, the current CI contract allows VFA-106:

- 68 hours daily / 340 hours weekly of contact time
- 10-wide scheduling
- No provision for CI usage during premium time

3. The remaining demand (52 percent in FY11) spent below CI allotted hours results in excess capacity and wasted dollars.

An unintended consequence of combining classes is the negative impact during larger lulls in demand. Based on FY11 weekly forecast demand data (Appendix 4), 52 percent of the time CI demand is less than their capacity. The Navy is paying for 68 hours per day, even when CI utilization is below 100 percent. The excess capacity therefore goes unused and equates to dollars that the Navy cannot retrieve.

4. The 10-wide CI limitation constrains scheduling, often leading to inefficient CI utilization rates.

Based on interviews with the Simulator Schedulers, the Current Operations Officer, and the Future Operations Officer, the restriction of only being able to schedule ten CIs, with 14 devices available, hinders production. While the NAPP Manager stated that the Production Planning Factors (PPFs) outline that VFA-106 should be supported by an 11-wide CI flow, the current contract continues to limit VFA-106 to a 10-wide flow.

Both Simulator Schedulers stated that their CI utilization rate is directly tied to the 10-wide constraint. They both said that had they had one extra CI to flow into the schedule, they would have been able to increase their CI utilization rate to 100 percent. They were both convinced that if not directly involved in the scheduling process, this seemingly small addition would be difficult to comprehend, further complicating the justification for an eleventh CI.

B. SIMPLY INCREASING CI MANNING IS NOT A LONG-TERM SOLUTION

1. Using 11 CIs and 76 hours or 12 CIs and 84 hours will not satisfy peak demand needs and exacerbates excess capacity problem during low demand.

One of the themes present in many interviews is the notion that adding CIs will solve VFA-106's CI demand problems. According to the Simulator COR, for every CI added, eight extra hours will have to be bought. As described above in Result A.3., this will complicate the inefficiency problems already seen to date. Also, VFA-106 still cannot meet its FY11 peak demand, during week 15, and will be way over the mark in week 20, as detailed below:

- 11 CIs @ 76 hours / day * 5 days / week = 380 hours / week
- 12 CIs @ 84 hours / day * 5 days / week = 420 hours / week
- Maximum demand, week 15, FY11 = 717.5 hours
- Minimum demand, week 20, FY11 = 78 hours

2. No ability to surge to meet peak demand.

With no other concessions or flexibility built into the contract, a contract based purely on hours does not fully meet the needs of VFA-106. According to interviews, VFA-106 has forced workarounds to solve their simulator problems. Whether it be shortening a 1.5-hour simulator to 1.0-hour, "doubling-up" two RACs on a 1.5-hour simulator, or simply waiving the simulator requirement altogether, VFA-106 is forced into a quantity versus quality game, which ultimately trickles down to the fleet squadrons in the form of less-qualified aircrew. In short, with no provision to add more CIs and hours during times of high demand, VFA-106 will continue its pattern of "just barely making it to detachment" by using creative, yet undesirable methods.

C. CURRENT VFA-106 SIMULATOR SCHEDULING CONSTRUCT IS INSUFFICIENT AND LACKS LONG-TERM VISION

1. Two-week operations forecast is insufficient.

Interviews with VFA-106 Operations personnel revealed that they only forecast two weeks when scheduling simulators. While this is a step in the proper direction, FY11 simulator demand data dictates that the look should go beyond two weeks. For example, should Operations wait until week 52 of FY10 to begin forecasting the first two weeks of FY11, they will find, starting in week two, their CI demand will be greater than CI capacity. What they probably won't discover is that the four weeks beyond week two all have greater demand than capacity as well. Bottlenecks will ultimately ensue, which will affect throughput.

2. There is no dedicated supervision of Simulator Schedulers and simulator scheduling lacks continuity.

An observation of the simulator scheduling process revealed two Simulator Schedulers, a government employee for the C/D side and overall academics and an active duty officer for the E/F side. While they perform their jobs admirably, there is no oversight into what they are doing, forcing them to omit the big picture from their scan, as they focus on filling in the next day's schedule.

3. The Simulator Schedulers' weekly forecast is insufficient.

The interviews with the Simulator Schedulers revealed that they have a general knowledge of the squadron's weekly forecast, but only work on a two-day look. With the schedule shell built two days in advance, they can "get ahead" by filling in where necessary; however, the Simulator Schedulers do not typically care nor see what is expected beyond the short-term look.

4. Class proximity to detachment typically dictates simulator priority, sometimes to a fault.

Observation of the simulator scheduling process and interviews with Operations personnel revealed that proximity to detachment plays a big role in simulator scheduling priority. While this is understandable, it should be noted that VFA-106's detachment-centric construct can often force periods of high demand, as Transition phase RACs fight for simulator time with Strike, Fighter, and Strike Fighter phase RACs, all based purely on the timing of where each class lies within the master syllabus. While it is necessary to get every RAC his/her simulator prerequisites prior to detachment, their priority may hold up other RACs in other phases of training. This phenomenon again creates RAC bottlenecks in the simulators, ultimately affecting throughput and production.

III. RECOMMENDATIONS

A. DRAFT AND UTILIZE A MORE FLEXIBLE CI CONTRACT

1. **Move away from the "hours" mindset**
    - Not flexible
    - Can never surge to meet peek demand
    - Wasted hours and dollars during periods of low demand
2. **Adopt proposed mission block concept**
    - Provides flexibility by getting away from "hours" mindset
    - 0.5 hours per block
    - Set a maximum of 152 blocks per day
3. **Increase to 11 CI's**
    - Compromise to help satisfy peak demand
    - Eases Simulator Schedulers' burden during periods of high demand
4. **Add in a surge capability**
    - Set at a maximum of five days per month
    - Surge up to 168 blocks per day
    - Increase CI requirement to 12 during surge
5. **Allow quarterly or monthly block input from VFA-106**
    - Quarterly or monthly block input will further refine demand forecast and provide optimal training with less dollars
    - Minimize empty blocks
6. **Design web-based scheduling assistant to fulfill block needs**
    - Allows for maximum visibility
    - Allows for ease of tracking utilization rates
7. **Release unused block time to fleet**
    - To avoid unused, paid-for block time, allow fleet CI usage
    - VFA-106 has CI priority, but can release CI blocks daily through web-based scheduling assistant
    - CIs must be trained to fleet standards

B. REDESIGN SIMULATOR SCHEDULING SHOP TO PROVIDE MORE CONTINUITY AND LONG-TERM VISION TO SIMULATOR SCHEDULING

1. Utilize government employee to supervise Simulator Schedulers

- With high turnover rate among active duty personnel within the command, the only continuity left in Operations is the government employee
- Allows for someone in touch with simulator scheduling who has a big picture look, beyond two weeks
- Now given direction, perhaps the simulator and academic schedule can be written by one active duty officer, vice two, freeing up resources

2. Simulator Supervisor's focus should be forecasting CI demand quarterly, vice every two weeks

- Will be able to "flatten out" sinusoidal demand wave (may never be able to fully reduce demand, but can spread it out) and provide for smarter "block" input
- Utilize master syllabus as a guide, but deviations may be required to reduce demand (i.e., move SLAT-102, normally flown in week 15, to week 18).

3. Simulator Supervisor continuously provides updated CI demand data monthly, weekly, and daily to Simulator Schedulers

- Lean out simulator scheduling process (reduce waste); identify unwanted blocks to be given to fleet
- Reduce variability in simulator scheduling

4. Shift "proximity to detachment as priority" paradigm to spread out demand

- May detect high demand problem in week 15 and find that delaying Strike or Fighter phase simulators (RACs who would normally have higher priority) to allow Transition phase RACs to complete their requirements (just to get in the jet) may reduce demand
- Requires constant contact with those writing flight schedule and detachment Officers-in-Charge, as master syllabus weekly requirements may be shifted

IV. CONCLUSION

As the United States military marches along the same economic route as the rest of the country, tough fiscal times will dictate workarounds to normal business practices. While nothing can fully substitute for time spent in the aircraft, F/A-18 simulators have advanced and have become a technically and fiscally viable option. As simulator utilization increases, so does the responsibility for optimizing training opportunities within them. Whether it is simulator device time or instructor time, these precious resources must be utilized smartly to make them cost effective. Having to augment CIs with active duty Flight Instructors sometimes and not utilizing their allotted daily simulator hours other times has forced VFA-106 to conclude that they have a problem with CI utilization, which was the genesis of this project.

Our analysis of the data, interviews with key personnel, and observations of the VFA-106 simulator scheduling process suggests that the squadron's CI utilization problems require actions for both external and internal elements of this issue. Externally, designing a new CI contract that gets away from the old "hours" paradigm will provide VFA-106 with the flexibility and surge capability that it requires in order to maximize its daily training opportunities. Internally, the squadron must redesign its simulator scheduling shop in order to better understand the holistic simulator requirement so the squadron can move simulator operations closer to maximum effectiveness.

VFA-106 will find that a combination of the fixes outlined in this report should allow them to forecast CI demand with greater accuracy, which will reduce bottlenecks and improve throughput in simulator training. Should a redesign of the CI contract not take place, improving the squadron's internal simulator scheduling processes should be undertaken to smooth out

demand and maximize training, ultimately removing the more expensive Flight Instructors from missions best accomplished by CIs; thereby saving the Navy money.

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APPENDIX 1

DATA COLLECTION PLAN

TYPICAL QUESTIONS ASKED OF SIMULATOR SCHEDULERS

Q1. What is your current job at VFA-106?

Q2. Please describe exactly what you do on a daily basis at VFA-106. Be as specific and detailed as possible.

Q3. What do you like best about simulator scheduling?

Q4. What do you like least about simulator scheduling?

Q5. If you could change anything about simulator scheduling, be it process, hours allotted in the box or for CIs, etc., what would you do and how would you do it?

Q6. Do you have a good sense of forecast simulator demand monthly, weekly, or daily?

Q7. How do you schedule CIs?

Q8. How often do you use IPs or IWSOs to meet simulator demands that could otherwise be accomplished with a CI?

Q9. In your opinion, is using Instructors to augment CIs a problem here at VFA-106?

Q10. Have you ever encountered difficulty filling allotted simulator time due to a lack of CIs and Instructors tied up by the rest of the flight schedule?

Q11. Do you think that VFA-106 needs more or less CI time than the current 68 hours per day allotted?

Q12. Do you have anything else to offer in regards to any simulator issues that we have or haven't already discussed?

TYPICAL QUESTIONS ASKED OF THE NAPP MANAGER

Q1. What is your current job at VFA-106?

Q2. Please describe exactly what you do on a daily basis at VFA-106. Be as specific and detailed as possible.

Q3. How far out have you forecast production requirements at VFA-106?

Q4. Are there any current or forecast issues that would affect production requirements in the future?

Q5. Who controls size and number of classes per year you will graduate and their spacing?

Q6. Do your production requirements factor in CAT "Others"? If not, how do you account for them?

Q7. How many CIs are required in your manning documents to meet the needs of production? What is it based on?

Q8. Does VFA-106 have a problem meeting its requirements in regards to CI manning?

Q9. In your opinion, is using Instructors to augment CIs a problem here at VFA-106? If so, why?

Q10. Do you have anything else to offer that we have or haven't already discussed?

TYPICAL QUESTIONS ASKED OF CURRENT & FUTURE OPERATIONS OFFICERS

Q1. What is your current job at VFA-106?

Q2. Please describe exactly what you do on a daily basis at VFA-106. Be as specific and detailed as possible.

Q3. What is your biggest challenge when it comes to the schedule?

Q4. What input do you have to the scheduling process and/or interaction with the schedulers?

Q5. If you receive input from other stakeholders (training, CAT Other coordinator, Wing, AIRLANT, etc.), when is it due to you? Does this submission ALWAYS provide you with all the data you need? How could it be improved?

Q6. Assuming you are responsible to the CO for the schedule, what, if any, limitations/restrictions/guidance has he placed on you?

Q7. Do you reserve and "prime" simulator time for any reason/person?

Q8. Do you have enough resources (simulators/instructors)?

Q9. In your opinion, what is being done well? What is being done poorly?

TYPICAL QUESTIONS ASKED OF THE SIMULATOR CONTRACTING OFFICER REPRESENTATIVE

Q1. What is the basis for your simulator instructor cadre?

Q2. How many full-time CIs do you currently have?

Q3. What is the pay schedule for a full-time employee?

Q4. How many events, and what type, does a full-time employee typically cover each day?

Q5. At full capacity, how many simulator hours per day can you cover under your current contract?

Q6. What are the hour requirements per event?

Q7. Do you have part-time employees?

Q8. What the part-timer pay schedule?

Q9. With part-time employees, are you able to cover the FRS surge requirements (i.e. > 68 hours box time per week)?

Q10. Is there a way to hire part-time CI for use during the FRS surge times?

Q11. How many would be required to supplement the current cadre to provide 70 hours per day in the box?

Q12. How much overtime would be required to provide 70 hours box time per day?

Q13. How much lead time do you require to set your schedule? Or do you keep the same number of CIs each week?

Q14. Are there any other ways (besides CI hours) that simulators could be apportioned to VFA-106 and the fleet?

Q15. Are CIs contractually obligated to serve VFA-106 only?

Q16. Is there something that I may have missed or topic for further discussion that you might add

APPENDIX 2

DATA ANALYSIS

VFA-106 first identified the CI demand problem inherent with "Super" classes in February 2010. Starting in March, the squadron began collecting CI, Instructor, and device utilization rate data in an effort to quantify their Instructor simulator demand (for simulators or lectures that could otherwise be given by a CI). BRB Consulting attained Tables 1 – 5 in July to assist in the study.

While the number of hours needed for VFA-106 flight instructors to augment the CIs may seem small in these tables, it is worth noting that the number has increased due to the "Super" class construct, which was first seen in June 2010, as class 10-3 (first "Super" class) began their workup for Strike detachment and classes 10-4 and 10-5 continued in the Transition phase of training.

Tables 1 – 5 also depict that, in only 20 percent of the cases where flight Instructors were used to augment CIs, CI utilization rate was at 100 percent. This data points to a possible problem in scheduling, forecasting, device time, or maximum CI allowable (10-wide).

	C/D CI use	E/F CI use	Total CI use	CI Ute Rate	C/D Instructor use	E/F Instructor use	C/D Box use	E/F Box use	Total Box Time	Box Ute Rate
1-Mar	5	35	40	58.8%						
2-Mar	2.5	46.5	49	72.1%						
3-Mar	8.75	26	34.75	51.1%				24	24	34.3%
4-Mar	16	27	43	63.2%			11.5	25	36.5	52.1%
5-Mar	21.5	24.5	46	67.6%				16.5	16.5	23.6%
6-Mar										
7-Mar										
8-Mar	8	15	23	33.8%						
9-Mar	14.5	24	38.5	56.6%			16.5	22.5	39	55.7%
10-Mar	28	39	67	98.5%		8	23.5	40	63.5	90.7%
11-Mar	30	34.5	64.5	94.9%			20.5	28	48.5	69.3%
12-Mar	30	37	67	98.5%	2.5	2.5	22.5	23.5	46	65.7%
13-Mar										
14-Mar										
15-Mar	19	49	68	100.0%	2		37.5	34	71.5	102.1%
16-Mar	23.5	44	67.5	99.3%			28.5	27	55.5	79.3%
17-Mar	29	38	67	98.5%			24	34.5	58.5	83.6%
18-Mar	25.5	42	67.5	99.3%			25.5	34	59.5	85.0%
19-Mar	30	36.5	66.5	97.8%			29.5	30	59.5	85.0%
20-Mar										
21-Mar										
22-Mar	28	35.5	63.5	93.4%	2		26.5	41.5	68	97.1%
23-Mar	29	37	66	97.1%	12.5		27	34.5	61.5	87.9%
24-Mar	30	38	68	100.0%		5	32	38	70	100.0%
25-Mar	29.5	37.5	67	98.5%			30.5	29	59.5	85.0%
26-Mar	18	47	65	95.6%			31	47.5	78.5	112.1%
27-Mar										
28-Mar										
29-Mar	29.25	31.5	60.75	89.3%			25	42.5	67.5	96.4%
30-Mar	28	40	68	100.0%			24.5	32	56.5	80.7%
31-Mar	29.5	38.5	68	100.0%	2		26.5	38.5	65	92.9%

Table 1. March 2010 CI, Instructor, and device time utilization

	C/D CI use	E/F CI use	Total CI use	CI Ute Rate	C/D Instructor use	E/F Instructor use	C/D Box use	E/F Box use	Total Box Time	Box Ute Rate
1-Apr	26.5	41.5	68	100.0%			24	39.5	63.5	90.7%
2-Apr	32	36	68	100.0%			27.5	28	55.5	79.3%
3-Apr										
4-Apr										
5-Apr	29	34	63	92.6%			23	26	49	70.0%
6-Apr	26	41	67	98.5%			25	33.5	58.5	83.6%
7-Apr	21.5	28.5	50	73.5%			25	26	51	72.9%
8-Apr	30	26.5	56.5	83.1%			29	26	55	78.6%
9-Apr	23	23	46	67.6%			29	25.5	54.5	77.9%
10-Apr										
11-Apr										
12-Apr	20	21.5	41.5	61.0%			18	29	47	67.1%
13-Apr	26	32.5	58.5	86.0%			24.5	27.5	52	74.3%
14-Apr	24	33.5	57.5	84.6%			22	33.5	55.5	79.3%
15-Apr	26.5	39.5	66	97.1%			22	32.5	54.5	77.9%
16-Apr	21.5	30	51.5	75.7%			16.5	27.5	44	62.9%
17-Apr										
18-Apr										
19-Apr	17	31	48	70.6%			14	25	39	55.7%
20-Apr	17.5	31.5	49	72.1%			9.5	20.5	30	42.9%
21-Apr	19.75	42.5	62.25	91.5%			14.5	26	40.5	57.9%
22-Apr	16.5	48.5	65	95.6%			13.5	34	47.5	67.9%
23-Apr	16.5	45	61.5	90.4%			8.5	32	40.5	57.9%
24-Apr										
25-Apr										
26-Apr	28.75	29	57.75	84.9%			19.5	25	44.5	63.6%
27-Apr	29	32	61	89.7%			17.5	38	55.5	79.3%
28-Apr	27	28.5	55.5	81.6%			22	19.5	41.5	59.3%
29-Apr	29.25	37	66.25	97.4%			21.5	29.5	51	72.9%
30-Apr	27.25	28.5	55.75	82.0%			22.5	24	46.5	66.4%

Table 2. April 2010 CI, Instructor, device time utilization

	C/D CI use	E/F CI use	Total CI use	CI Ute Rate	C/D Instructor use	E/F Instructor use	C/D Box use	E/F Box use	Total Box Time	Box Ute Rate
1-May										
2-May										
3-May	29.75	36.1	65.85	96.8%			24.5	24	48.5	69.3%
4-May	29.5	38.5	68	100.0%			26.5	26.5	53	75.7%
5-May	27.5	29.5	57	83.8%			28.5	24.5	53	75.7%
6-May	31	36.5	67.5	99.3%			29	22.5	51.5	73.6%
7-May	19	17.5	36.5	53.7%			18	23.5	41.5	59.3%
8-May										
9-May										
10-May	14.5	36	50.5	74.3%			11.5	25.5	37	52.9%
11-May	27.25	19	46.25	68.0%			18.5	19.5	38	54.3%
12-May	13	16.5	29.5	43.4%			13	20	33	47.1%
13-May	15.5	34	49.5	72.8%			15.5	38	53.5	76.4%
14-May	29.5	29	58.5	86.0%			25.5	23	48.5	69.3%
15-May										
16-May										
17-May	15	52	67	98.5%			13	41.5	54.5	77.9%
18-May	15.5	39.5	55	80.9%			13	29	42	60.0%
19-May	17.5	37.5	55	80.9%			13	26.5	39.5	56.4%
20-May	23.5	25	48.5	71.3%			24	19	43	61.4%
21-May	30	12.5	42.5	62.5%			23	11	34	48.6%
22-May										
23-May										
24-May	17.5	27	44.5	65.4%			18.5	22	40.5	57.9%
25-May	17.5	36.8	54.3	79.9%			18	29	47	67.1%
26-May	21	35.1	56.1	82.5%		8.4	18	31.5	49.5	70.7%
27-May	12.5	29.5	42	61.8%			15.5	25	40.5	57.9%
28-May	9.25	10	19.25	28.3%			8.5	7	15.5	22.1%
29-May										
30-May										
31-May										

Table 3. May 2010 CI, Instructor, device time utilization

	C/D CI use	E/F CI use	Total CI use	CI Ute Rate	C/D Instructor use	E/F Instructor use	C/D Box use	E/F Box use	Total Box Time	Box Ute Rate
1-Jun	28	8.5	36.5	53.7%			16.5	6	22.5	32.1%
2-Jun	17.5	19.5	37	54.4%		1	19.5	20	39.5	56.4%
3-Jun	12.5	9	21.5	31.6%		10	17.5	14.5	32	45.7%
4-Jun	24	15.5	39.5	58.1%			17.5	15	32.5	46.4%
5-Jun										
6-Jun										
7-Jun	18	24.5	42.5	62.5%			18.4	13	31.4	44.9%
8-Jun	20.5	23	43.5	64.0%		13	29	22	51	72.9%
9-Jun	29	28	57	83.8%		8.5	22	32	54	77.1%
10-Jun	11	14	25	36.8%			16	20	36	51.4%
11-Jun	9	32.5	41.5	61.0%			10	25	35	50.0%
12-Jun										
13-Jun										
14-Jun	22	32.5	54.5	80.1%			20.5	23.5	44	62.9%
15-Jun	23.5	26.5	50	73.5%		14	24.5	27.5	52	74.3%
16-Jun	27	34.5	61.5	90.4%			29	23.5	52.5	75.0%
17-Jun	16	35.5	51.5	75.7%			22	31	53	75.7%
18-Jun	23.5	42	65.5	96.3%				31.5	31.5	45.0%
19-Jun										
20-Jun										
21-Jun	20	27	47	69.1%			22.5	18.5	41	58.6%
22-Jun	29	36.5	65.5	96.3%			19	19.5	38.5	55.0%
23-Jun	32.5	34	66.5	97.8%			24	19	43	61.4%
24-Jun	30.5	37.5	68	100.0%			27.5	22	49.5	70.7%
25-Jun	34	33	67	98.5%		2.5	32.5	20	52.5	75.0%
26-Jun										
27-Jun										
28-Jun	35	32	67	98.5%			27.5	13	40.5	57.9%
29-Jun	24	20	44	64.7%		11	28	20.5	48.5	69.3%
30-Jun	23.5	39	62.5	91.9%		28.5	29.5	44	73.5	105.0%

Table 4. June 2010 CI, Instructor, device time utilization

	C/D CI use	E/F CI use	Total CI use	CI Ute Rate	C/D Instructor use	E/F Instructor use	C/D Box use	E/F Box use	Total Box Time	Box Ute Rate
1-Jul	33	33	66	97.1%	4	8.5	31	30.5	61.5	87.9%
2-Jul	28	40	68	100.0%		8.5	28.5	43.5	72	102.9%
3-Jul										
4-Jul										
5-Jul										
6-Jul	15.5	37.5	53	77.9%			15.5	29.5	45	64.3%
7-Jul	21.5	38.5	60	88.2%			24	32.5	56.5	80.7%
8-Jul	16.5	32	48.5	71.3%		10	22.5	33.5	56	80.0%
9-Jul	17	32.5	49.5	72.8%			23	32.5	55.5	79.3%
10-Jul										
11-Jul										
12-Jul	22	36.5	58.5	86.0%			27.5	27.5	55	78.6%
13-Jul	29.5	38.5	68	100.0%		4	27.5	28	55.5	79.3%
14-Jul	28.5	37.5	66	97.1%			19.5	24	43.5	62.1%
15-Jul	31	36.5	67.5	99.3%			25	25.5	50.5	72.1%
16-Jul	31.5	33.5	65	95.6%			18.5	33.5	52	74.3%
17-Jul										
18-Jul										
19-Jul	29.5	38.5	68	100.0%			17	34.5	51.5	73.6%
20-Jul	32	31.5	63.5	93.4%			18	27.5	45.5	65.0%
21-Jul	31	33	64	94.1%			17.5	27.5	45	64.3%
22-Jul	29.5	36	65.5	96.3%			22	24	46	65.7%
23-Jul	30.5	35.5	66	97.1%			21	31	52	74.3%

Table 5. July 2010 CI, Instructor, device time utilization

APPENDIX 3

DATA ANALYSIS

A thorough review of FY11 – FY14 forecast RAC data was done using Tables 6 – 9. The data, provided by the NAPP Manager, details expected production requirements for each category RAC, both in raw number and RAC Equivalency (R/E). The R/E is formulated from outside of the command, based on attrition, among other factors. The bottom line is that VFA-106 can expect a steady stream of demand, both on the C/D and E/F side, through FY14. A review of the data proved that FY11 was the highest demand year, which is the basis of the study.

VFA-106 C/D PROJECTIONS:	**FY09**		***FY09 R/E***	**FY10**		***FY10 R/E***	**FY11**		***FY11 R/E***
	Navy	**Marine**		**Navy**	**Marine**		**Navy**	**Marine**	
CAT 1	*15*	14	*29.0*	*14*	*16*	*30.0*	*17*	18	35
CAT II	*7*	0	*6.3*	*1*	*0*	*0.9*	*1*	0	0.9
CAT III	*7*	7	*9.0*	*16*	*14*	*19.2*	*8*	11	12.2
CAT IV	*23*	8	*4.3*	*23*	*8*	*4.3*	*26*	7	4.6
CATV	*12*	3	*2.1*	*14*	*6*	*2.8*	*14*	5	2.6
TOTAL	***64***	**32**	***50.7***	***68***	***44***	***57.2***	***66***	**41**	**55**

FY12		***FY12 R/E***	**FY13**		***FY13 R/E***	**FY14**		***FY14 R/E***
Navy	**Marine**		**Navy**	**Marine**		**Navy**	**Marine**	
22	18	40	*23*	16	40	*21*	16	37
1	0	0.9	*1*	0	6	*5*	0	5
8	10	11.5	*7*	10	11	*5*	6	7
33	6	5.4	*31*	6	5	*41*	8	7
13	5	2.5	*8*	5	2	*28*	3	4
77	**39**	**60**	***70***	**37**	**64**	***100***	**33**	**60**

Table 6. FY11-FY14 F/A-18C/D RAC Forecast

VFA-106 E/F PROJECTIONS:	FY09	*FY09 R/E*	FY10	*FY10 R/E*	FY11	*FY11 R/E*	FY12	*FY12 R/E*	FY13	*FY13 R/E*	FY14	*FY14 R/E*
CAT 1	36.0	*36.0*	30.0	30.0	47.0	47.0	46.0	46.0	42.0	42.0	41.0	41.0
CAT II H	10.0	*2.1*	10.0	2.1	12.0	2.5	5.0	1.0	12.0	2.5	16.0	3.3
CAT II T	3.0	*2.1*	2.0	1.4	2.0	1.4	0.0	0	0.0	0	0.0	0
CAT II S	6.0	*6.0*	4.0	4.0	2.0	2.0	0.0	0	2.0	2	0.0	0
CAT II G	0.0	*0.0*	6.0	6.0	3.0	3.0	0.0	0	0.0	0	0.0	0
CAT III	8.0	*3.3*	8.0	3.3	10.0	4.1	10.0	4.1	11.0	4.6	15.0	6.2
CAT IV	31.0	*4.2*	34.0	4.6	36.0	4.9	36.0	4.9	37.0	5.0	39.0	5.3
CATV	15.0	*1.6*	20.0	2.1	21.0	2.2	21.0	2.2	22.0	2.4	25.0	2.7
FMS	0.0	*0.0*	1.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	***109.0***	***55***	***115.0***	**54.5**	**134.0**	**68.1**	**118.0**	**58.3**	**126.0**	**58.4**	**136.0**	**58.5**

Table 7. FY11-FY14 F/A-18E/F REPLACEMENT PILOT Forecast

VFA-106 E/F WSO PROJECTIONS:	FY09	*FY09 R/E*	FY10	*FY10 R/E*	FY11	*FY11 R/E*	FY12	*FY12 R/E*	FY13	*FY13 R/E*	FY14	*FY14 R/E*
CAT 1	20.0	*20.0*	20.0	20.0	21.0	21.0	20.0	20.0	24.0	24.0	21.0	24.0
CAT II T	3.0	*2.2*	2.0	1.5	2.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0
CAT II S	3.0	*3.0*	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	1.0	1.0
CAT II G	2.0	*2.0*	3.0	3.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT III	4.0	*1.5*	2.0	0.7	5.0	1.8	5.0	1.8	5.0	1.8	4.0	1.5
CAT IV	12.0	*1.6*	12.0	1.6	13.0	1.8	13.0	1.8	13.0	1.8	15.0	2.0
FMS	0.0	*0.0*	0.0	0.0	2.0	2.0	2.0	2.0	0.0	0.0	0.0	0.0
TOTAL	**44**	***30.3***	***40***	***27.8***	***46***	***31.1***	***41***	***26.6***	***44***	***29.6***	***41***	***28.5***

Table 8. FY11-FY14 F/A-18E/F REPLACEMENT WSO Forecast

Sum R/E	FY
154	11
145	12
152	13
147	14

Table 9. FY11-FY14 Total RAC forecast

APPENDIX 4

WEEK	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
TOTAL CI DEMAND/WEEK	250.6	481.1	460.9	394.9	352.0	481.5	159.5	143.7	264.1	603.3	387.1	239.5	331.5	382.6	717.5	375.0
TOTAL CI CAPACITY	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340

WEEK	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
TOTAL CI DEMAND/WEEK	291.1	483.5	447.9	78.0	330.0	301.9	439.4	331.9	202.4	289.0	354.5	378.9	410.0	303.3	172.0	442.6
TOTAL CI CAPACITY	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340

WEEK	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
TOTAL CI DEMAND/WEEK	197.5	234.0	355.0	506.2	517.0	312.6	179.5	426.4	356.0	145.5	241.4	299.6	455.3	540.0	463.5	136.0
TOTAL CI CAPACITY	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340

WEEK	49	50	51	52
TOTAL CI DEMAND/WEEK	188.5	105.0	281.6	281.6
TOTAL CI CAPACITY	340	340	340	340

= More Hours Required than CI Hours Allotted = 25 out of 52 weeks = 48.08%

Avg High demand => 448.5 hours

Table 10. FY11 Forecast CI hours demand versus capacity

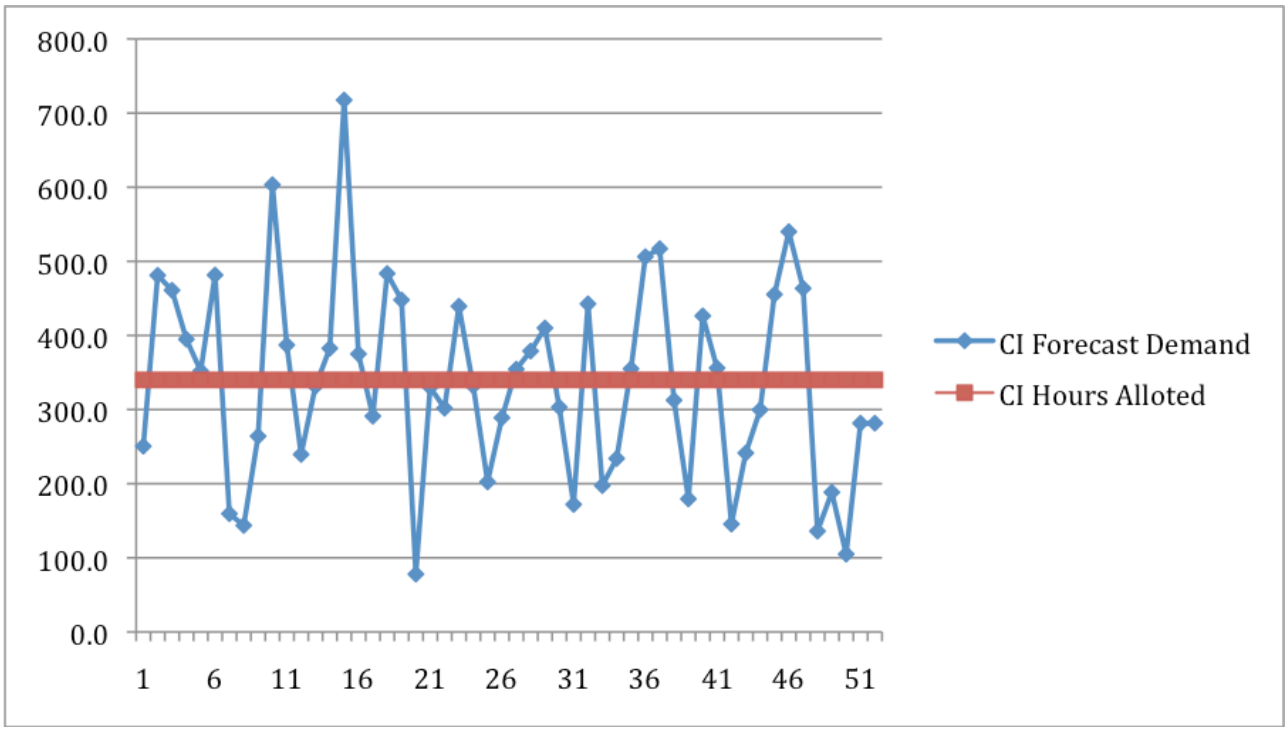

Figure 1. FY11 Forecast CI hours demand versus capacity

APPENDIX 5

APPLICATION OF LEAN SIX-SIGMA

BRB Consulting used the principles of Lean Six-Sigma[1] to improve the CI Utilization process at VFA-106. By focusing on the five laws of Lean Six-Sigma, BRB Consulting was able to identify findings and provide recommendations for VFA-106.

The Zeroth Law (Law of market)

The fleet defines and demands quality, which should become the highest priority for VFA-106 when it comes to properly training their RAC. Because of this responsibility, VFA-106 must demand quality from the CI cadre. Both VFA-106 and CIs must continually improve the scheduling process, as VFA-106's ability to satisfy the fleet's demand for quality aircrew directly relies on it.

The First Law (Law of Flexibility)

VFA-106's simulator scheduling process and the CI scheduling process has proven to be rigid and unreceptive to changes. This rigidity and resistance to change has slowed throughput, forcing IPs and IWSOs to increase capacity. VFA-106's and the CIs capability to respond to a need for flexibility and change will correlate with reduced bottlenecks and increased throughput in simulator training.

The Second Law (Law of Focus)

20 percent of the activities in a process cause 80 percent of the delay. By focusing on the 20 percent, which BRB Consulting interprets as the long-term forecasting of simulator CI demand requirements, VFA-106 will reduce the bottleneck in simulator training.

[1] Jacowski, Tony. *5 Laws of Lean Six Sigma.* Retrieved on 19 August 2010 from Ezine @rticles Website: http://ezinearticles.com/?5-Laws-Of-Lean-Six-Sigma&id=245112

The Third Law (Law of Velocity)

The velocity of any process is inversely proportional to the amount of Work in Progress (WIP). For VFA-106, BRB Consulting again points to the simulator scheduling process. Without supervision and long-term vision, WIP (or CI demand) mounts, causing the velocity of the scheduling process to slow down. With the slow down come shortcuts or clever scheduling techniques to prepare each RAC for their next phase of training.

The Fourth Law (Law of Complexity)

By switching to "Super" classes, VFA-106 has figured this law out. The complexity of training the various categories of RAC adds more non-value, costs and, WIP than poor quality or slow speed process problems. By reducing the complexity of many classes down to "Super" classes, VFA-106 has brought to light other problems (described in Laws Zero – Three). VFA-106 should then focus on the least complex solution, correcting its internal processes, prior to correcting the external problems.